

Disclaimer: The views expressed are those of Paul Gipe and are not necessarily those of the sponsor.

Disclosure: Paul Gipe has worked with Aerovironment, ANZSES, APROMA, ASES, AusWEA, AWEA, BWEA, BWE, CanWEA, CAW, CEERT, DGW, DSF, EECA, ES&T, GEO, GPI Atlantic, IREQ, KWEA, MADE, Microsoft, ManSEA, MSU, NRCan, NRG Systems, NASA, NREL, NZWEA, ORWWG, OSEA, PG&E, SeaWest, SEI, TREC, USDOE, WAWWG, WE Energies, the Folkecenter, the Izaak Walton League, the Minnesota Project, the Sierra Club, and Zond Systems, and written for magazines in the USA, Canada, France, Denmark, and Germany.

Advanced Renewable Tariffs New Policy Option for North America



Paul Gipe, wind-works.org

North Americans are Dabbling Around the Edges of Renewable Energy Policy

Little Recognition of the Crisis Facing the Continent

Complacency is Not a Policy

Inaction is Not an Option

There's No Time to Lose



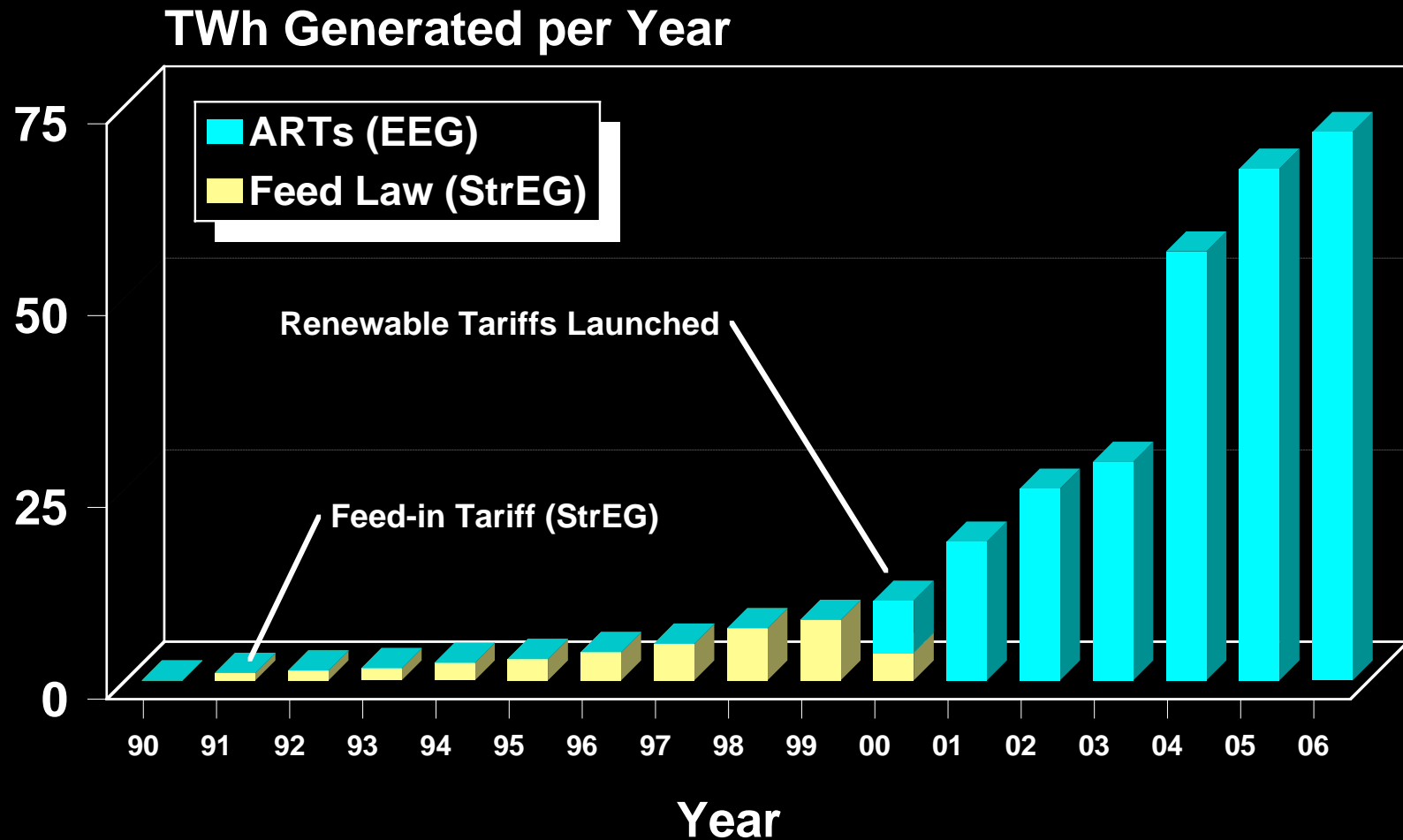
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Skibsted Fjord, Denmark

Why the European Success?

- **#1 Community Involvement**
Germany & Denmark
- **#2 Advanced Renewable Tariffs**
16 EU Countries use Electricity Feed Laws

German Renewable Generation



Germany's Renewable Tariffs The Results (2006)

- Renewables 11.5% of Supply
- Renewables Generating 70 TWh/yr
- 70,000 Employed in Wind Industry
- 35,000 Employed in PV Industry
- 8,000 Employed in Biogas Industry
- 170,000 Employed in Renewables
- €16.4 (\$20+) Billion Turnover

Germany's Renewable Tariffs

The Results (2006)

- 300,000 PV Installations
- 2,000 Biomass Plants
- 550 MW Farm Biogas, 10 TWh/yr
- 6,000 Hydro Plants
- 18,000 Wind Turbines
- Total of ~350,000 Generators!

Höhe Westerwald, Germany

Setting the Stage

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Myths to Dispel

- Renewables are Free
- Renewables are Cheap
 - Wind in Particular
- Renewables Can't Be Added Quickly & In Large Amounts
- Net Metering Can Make a Difference

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Husum, Germany

Renewable Tariffs The Philosophical Context

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Geothermal: Colline Metallifere, Italy

What Are Our Goals?

- **Primary**

High Penetration of Renewables Quickly

- **Secondary**

Equitably Distributed Ownership

Rural Development

Sustainable Manufacturing

Distributed Generation

Improve Resiliency

Reduce Transmission Losses

Firm-Up Wind's Variability



Do We Want Renewables?

- Peak Oil, Peak Gas
- Climate Catastrophe
Europe, 2003: 52,000 Dead
- Public Support High
at Level Not Seen in 20 Years
- Desire for New Jobs
in Manufacturing

If Yes, Then What Works Best?

- **Who Gets Contracts (PPAs)**
Elite Few or All Who Want Them?
- **How To Pay For Premiums**
RECs/ROCs/Green Tags
Subsidies (PTC, WPPI)
Advanced Renewable Tariffs

If We Use a Market Model, Then

- **You Get What You Pay For**
- **If You Want It You Must Pay For It**
- **Difference Between Cost & Price**
The Margin Determines Rate of Growth
- **High or “Premium” Prices Deliver**
More Generation
More Quickly
More Manufacturing . . . And Jobs

Political Price-Political Quantity Markets

	Price	Quantity
Feed Law	Political	Market
Quota/RPS /Tendering	Market	Political

Both are Market Mechanisms

Market Mechanism Status

- **Premium Prices (Renewable Tariffs)**
Typically Non-Anglophone Countries
Aggressive Targets
- **Quotas (RPS & Tendering)**
Typically Anglophone Countries
Timid Targets Seldom Met

Evolution of Market Mechanisms

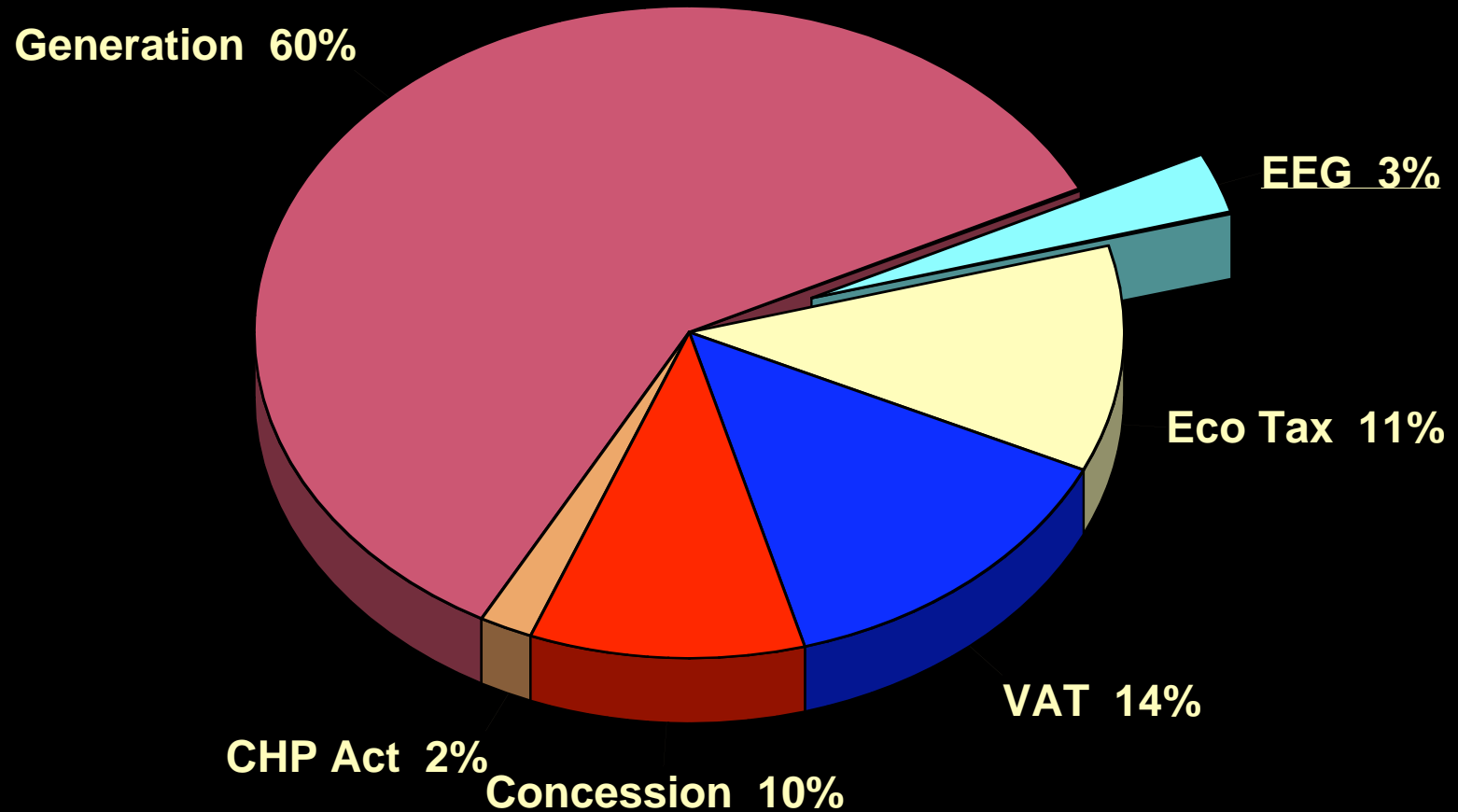
- ARTs Developing Momentum
 - RPS/Quota May Have Peaked
- Exemplars Weakening

California?

Italy?

Britain?

Cost of German EEG



Paying for German EEG

- **Wind, Hydro, Biomass**
Less than External Costs Avoided
- **Solar PV**
More than External Costs Avoided
- **Total EEG Expenditures**
Less than External Costs Avoided
BMU (German Ministry of the Environment) &
UBA (German Environmental Agency)

Renewable Tariffs in North America .. Unthinkable?

- Yes--Just 3 years ago
- Today? No
- Now Possible

Paul Gipe, wind-works.org

WindShare, Toronto



Renewable Tariffs: Trend Growing in North America?



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Husum, Germany

Advanced Renewable Tariffs North American Endorsements

- **Ontario**

Liberal Party, 2004

Green Party, 2006

- **Canada's Federal NDP 2006**

- **USA--Al Gore March 21, 2007**

- **NGOs**

NFU, GLU, BCWEA, CanWEA, CanSIA

Sierra Club (USA), DSF (Canada)

RENEW Wisconsin (USA)



Advanced Renewable Tariffs Momentum in North America

- WE Energies (PV)
- California (PV >100 kW)
- Ontario
- British Columbia
- Hawaii (PV @ \$0.70/kWh)?
- Michigan?

Paul Gipe, wind-works.org

Freyssenet, France



Advanced Renewable Tariffs

- **What Are They?**

Feed Laws or Minimum Price Systems

Political Price, Not Political Quota

Simple or No Contracts

- **How Do They Work?**

Simple, Comprehensible, Transparent, Little Administration

- **Where?**



Renewable Energy Tariffs Status

Standard	Non-Standard	Pending	Proposed
Austria	Czech Republic	Hungary	Hawaii?
Brazil	Ireland		Japan?
France	Minnesota C-BED		Michigan?
Germany	PEI, Canada		Quebec?
Greece	Washington State		
Italy (PV)	Turkey (Wind)		
Ontario			
Portugal			

Renewable Tariff Design

- Simple, Comprehensible, & Transparent
- Priority Interconnection & Purchase
- Prices Sufficient to Drive Development
- Lengths Sufficient for Profitability
- Fair But Not Undue Profit
- Price Differentiation

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Altamont Pass, California



Renewable Energy Tariffs

Contract Length

Country	Wind	Solar	Hydro	Biomass
Austria	13			
France	15	20	20	15
Germany	20	20	20	20
Ontario	20	20	20	20
Portugal	12	12	12	
Spain*	>15	>25	>25	>20
Turkey	7			
Washington State		9		

Renewable Energy Tariffs

Program Limits

Country	Wind	Solar	Hydro	Biomass
Austria		15 MW		
California*		3,000 MW		
Denmark	20%			
France	17,000 MW	500 MW	2,000 MW	2,000 MW
Germany	No Limit	No Limit	No Limit	No Limit
Italy		500 MW		
Ontario	No Limit	No Limit	No Limit	No Limit
South Korea		1,300 MW		
Spain	20,000 MW	400 MW	2,400 MW	3,200 MW

Renewable Tariffs Inflation Adjustment

	Inflation Adjustment
Germany	0%
Ontario RFP	15%
Ontario SOC	20%
Prince Edward Island	26%
France	60%
Spain	100%
Greece	100%
Ireland	100%

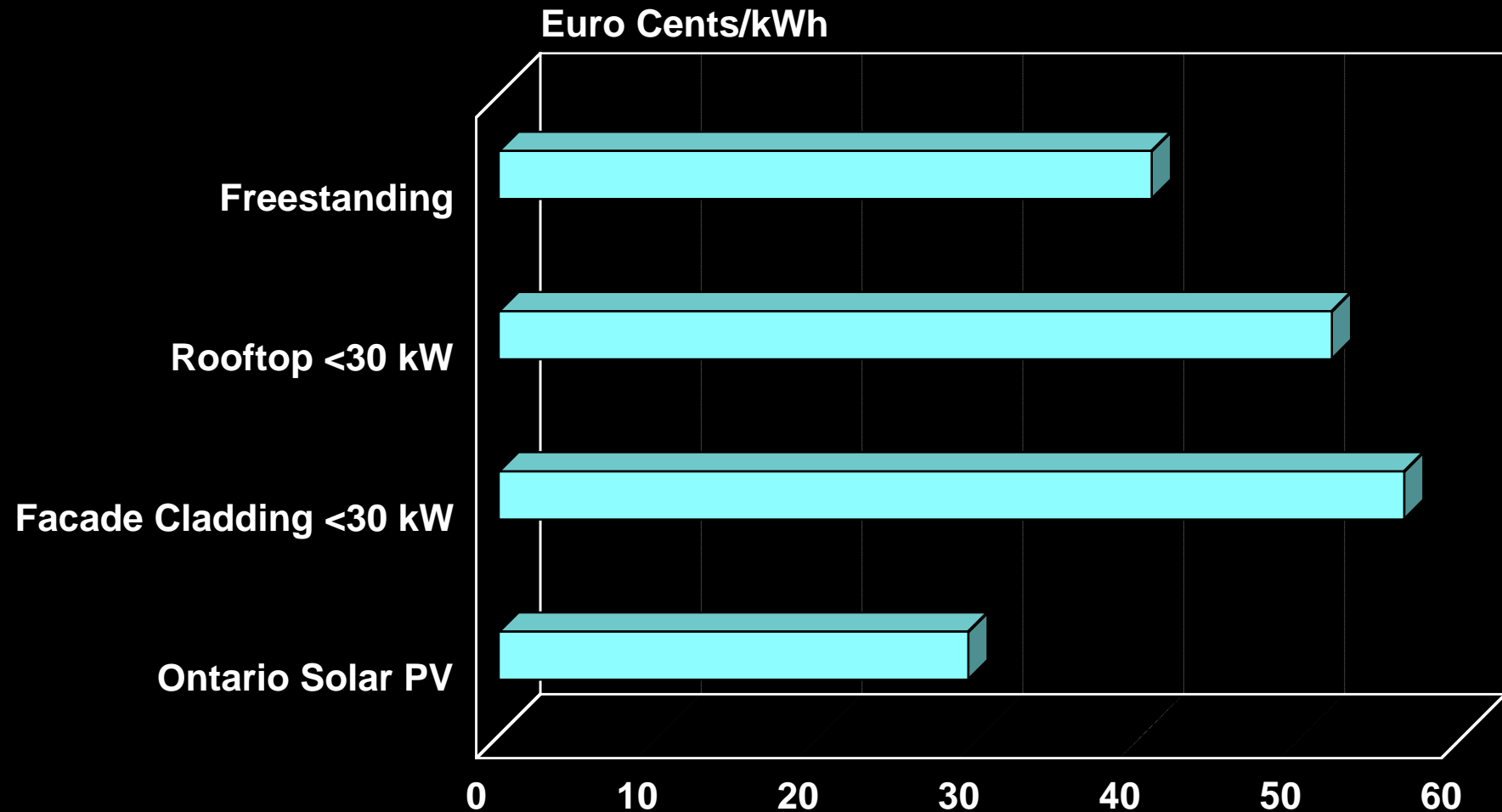
Renewable Tariff Design

- **Price Differentiation**
 - For Different Technologies
 - For Different Applications
 - For Different Sizes
 - For Different Regions
 - For Different RE Intensities



Germany

Application Differentiation for Solar PV



Differentiated Tariffs for Wind

- **Distributed Benefits**

Only Accrue From Distributed Generation

Mega Wind = Centralized Generation

- **Differentiated Tariffs Distribute Wind Development**

- **Reduces Pressure on Windiest Sites**

Profitability Still Higher at Windy Sites

- **Reduces NIMBYism**

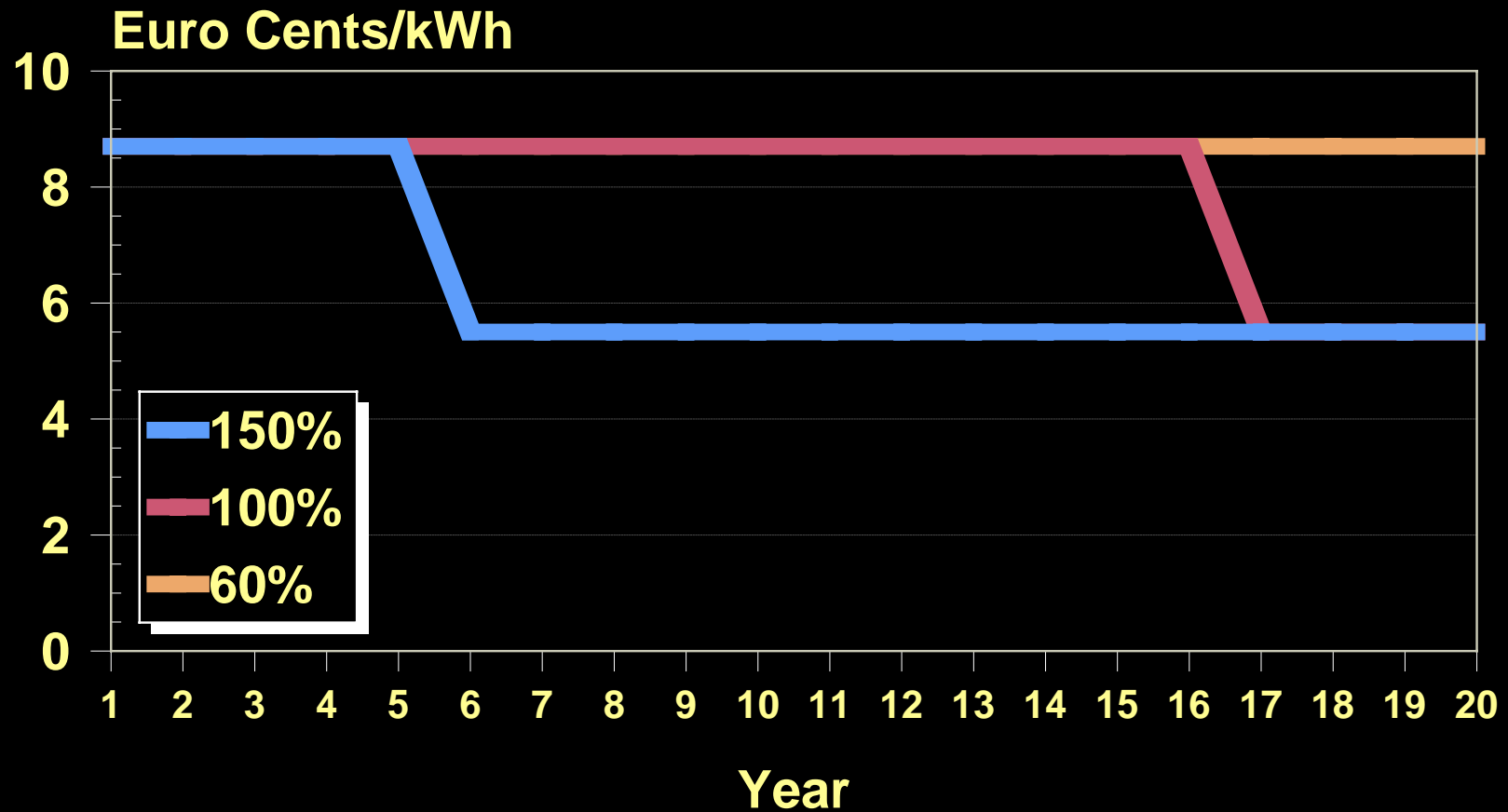
By Enabling Greater Participation

By Reducing Pressure on Wind Ghettos

Differentiated Tariffs for Wind

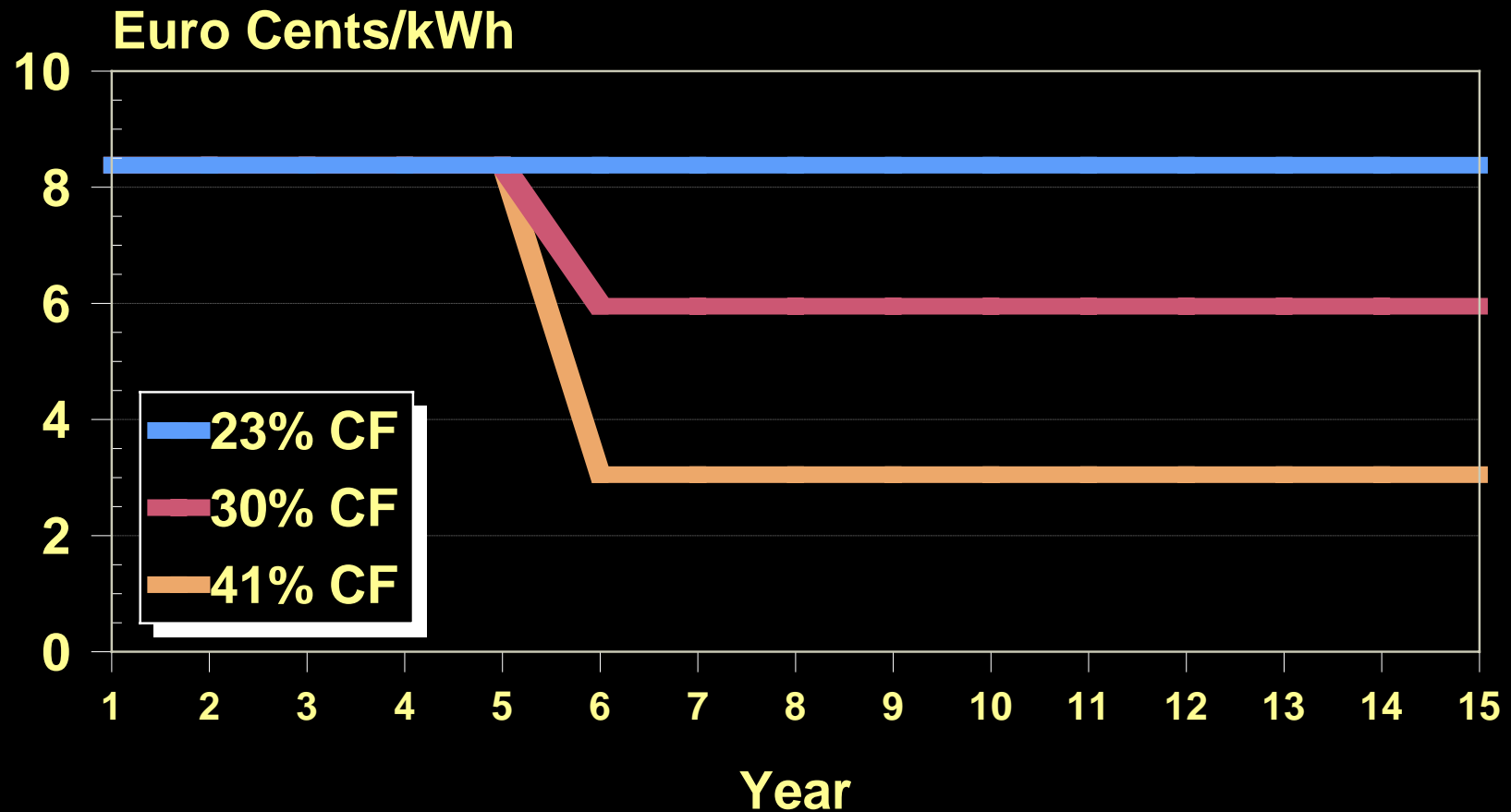
- **Increases Program Flexibility**
Lessens Pressure to Get Prices Right the First Time
- **Reduces Development Risk**
Developers Often Over Estimate Production
Determining Final (T2) Price After 5 Years of Operation
- **Spreads Opportunity to All**
Not Just to Elite Few
- **Provides Fair Profits at Modest Wind Sites**
- **Limits "Excessive Profits" at Windy Sites**

German Wind Tariffs Reference Yield Method



French Wind Tariffs

Profitability Index Method



Ontario's Standard Offer Program

**“The Most Progressive Renewable
Energy Policy in North America
in Two Decades”**

Dr. David Suzuki



Paul Gipe, wind-works.org

Advanced Renewable Tariffs for Ontario

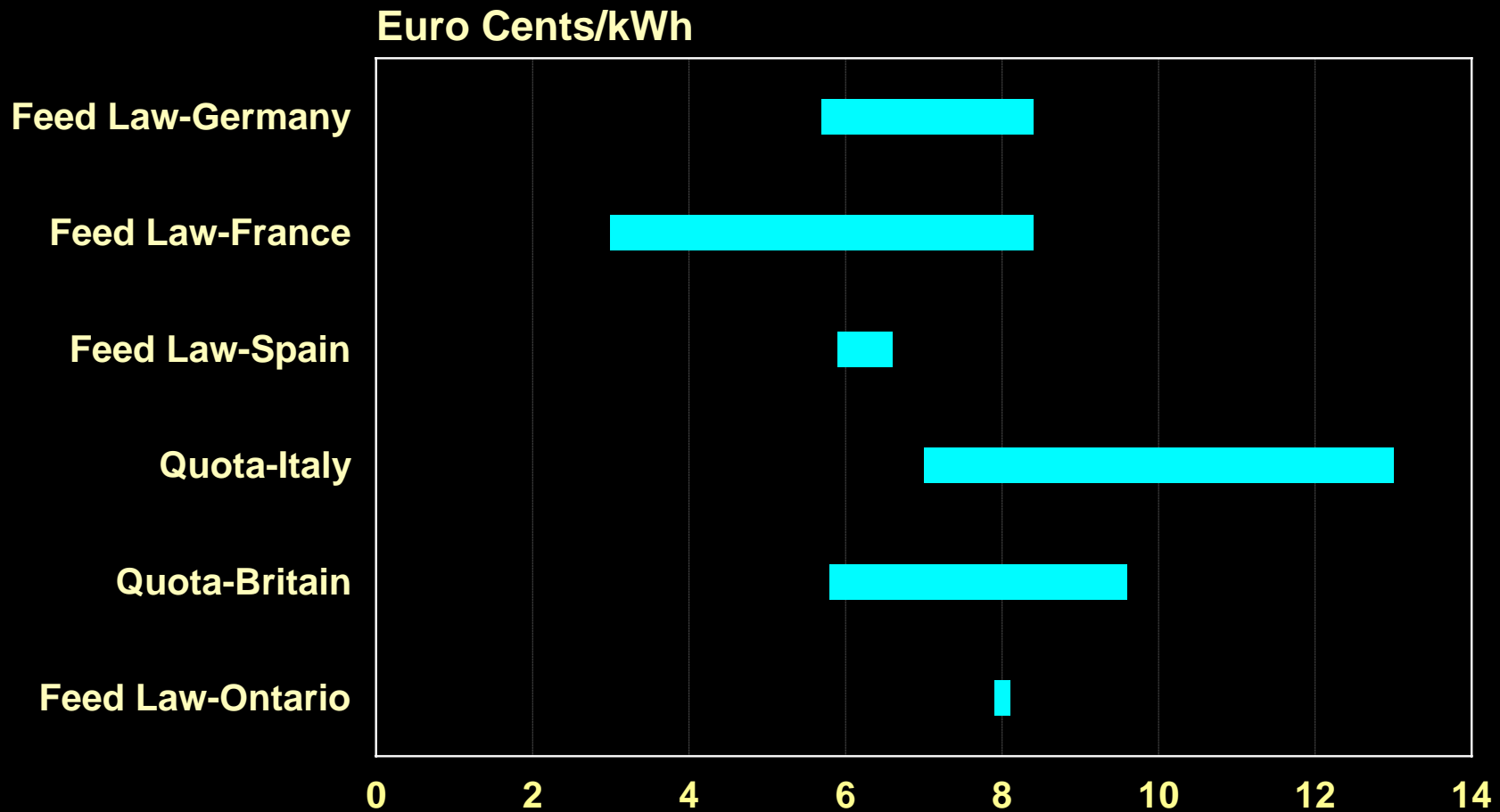
- Wind, Solar, Hydro, Biomass
- <44kV, <10 MW
- Inclusive--Open to All
- No Program Cap



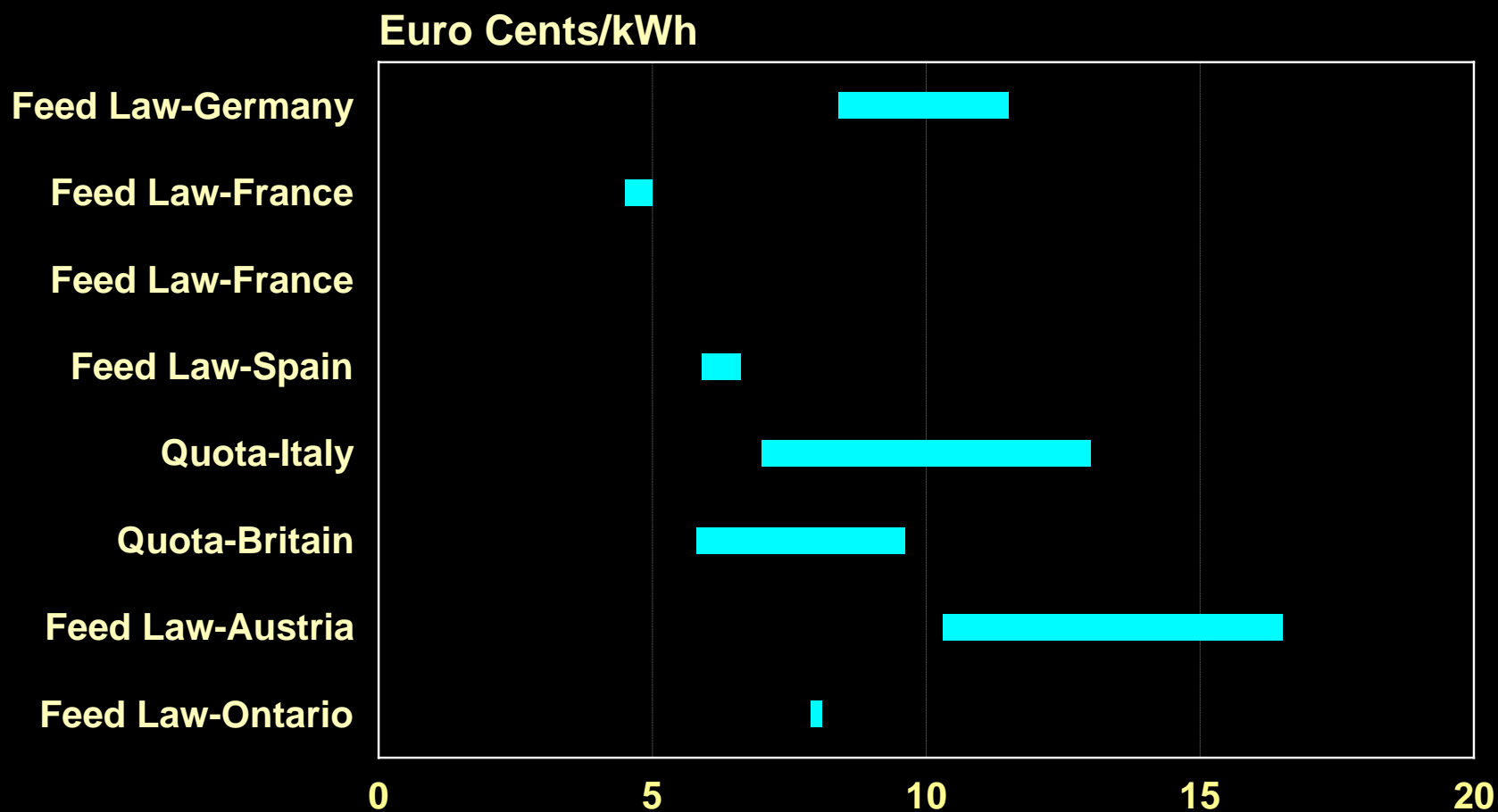
Ontario's SOC/ARTs

- Wind, Hydro, & Biomass: \$0.11/kWh
- Hydro & Biomass
\$0.0352/kWh on peak
- Solar PV: \$0.42/kWh
- Inflation Adjustment: 20%,
Except Solar PV (Punitive?)
- Term: 20 years

Prices Paid for Wind Energy in Europe



Prices Paid for Biomass in Europe



Prices Paid for Solar PV in Europe

Ontario Solar Tariff North American Comparison

Ontario SOC/ARTs Results (November-April 2007)

- **Residential PV: 150 kW?**
- **Commercial PV: 50 MW?**
- **~20 MW Hydro**
- **230 MW Wind**
- **~50 MW Installed in 2007?**
- **~100 MW/month in Contracts**
- **Rush for Connections**

Ontario's SOCs: What's Wrong?

- **Tariffs Too Low**

PV: 1/2 of What's Needed

Wind: Only Windy Sites

Biomass: \$0.17 CAD/kWh MoAF

- **Inflation Adjustment Too Low**

20% vs 50%: -2.5% ROI

Excluding Solar Punitive?



Advanced Renewable Tariffs

OSEA's Proposed Prices

Ontario's SOCs: What's Wrong?

- **Wind Tariff Differentiation**
 - Not Enough at Less Windy Sites
 - Too Much at Windy Sites
- **Fundamental Philosophical Shift**
 - Cost vs Value Debate Continues
 - Minister of Energy--Yes
 - OPA--Absolutely, Positively No!
- **Antiquated Grid**
 - 7 month Hydro One Backlog!

Ontario's SOCs: What's Wrong?

- **OSEA Lost the Language Battle**
- **Language Frames the Debate**
Difficult to Reclaim Once Lost
- **Language--Not an Insignificant Issue**
Feed Law --> Renewable Tariffs --> ARTs
ARTs are not SOCS
SOCS = Standard Contracts
ARTs Not Standard--Differ by Technology
- **Stick with Feed Law or ARTs**
~~Production Based Incentives~~

Hamburg Landfill, Germany

Renewable Tariff Design Periodic Review

- A “Wise & Prudent” Policy
- Ensures Prices are Right
- Ensures that the Program is “Robust Enough”

Ontario Can Do Better!

Bill Kemp, PowerBase

Paul Gipe, wind-works.org



Ontario's Standard Offer Program What's Next?

“ . . . Find the right mechanism to spread the use of wind across the province.”

“ . . . We will bring the barriers down.

“We did it because it was the right thing to do.

**Minister of Energy Dwight Duncan,
April 12, 2007**

Ontario's Standard Offer Program What's Next?

- 2 Year Review (OSEA has Begun)
- Revisit
 - Prices
 - Increase Differentiation
 - Differentiated Tariffs for Wind
 - Inflation Indexing (60%)
- Add Offshore Wind
- Add Solar Thermal

What's Next?

Solar DHW & Solar Space Heating

- **Germany**

Proposed Wärme Gesetz

Costs Spread Across Heating Oil & Gas

- **Monitoring Technology Exists**



Ontario's Standard Offer Program

What's Next?

- **Lift Voltage Cap**
Transmission Voltages
- **Lift Project Size Cap**
50 MW?
- **Priority Access**
Farmers, First Nations, Co-ops?
- **Priority Purchase**
Renewables before Nuclear & Fossil Fuels

Replicating The “Ontario” Model

Paul Gipe, wind-works.org



- Official
BC, Saskatchewan,
Manitoba
- Unofficial
Québec, Nova Scotia,
Michigan?

Plus Energy House, Freiburg, Germany

Advanced Renewable Tariffs

- **Deliver More Capacity--
--More Quickly
--More Equitably**

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Advanced Renewable Tariffs

A Question of Equity

- Feed Laws are Fair
- Nearly All Can Play

Farmers, Ranchers, First Nations, & Co-ops

Gaspé, Quebec

No Time for Half Measures

No Time to Lose

Paul Gipe, wind-works.org



Renewables: When You Look Closely Worth Every Cent

Paul Gipe, wind-works.org



Renewable Energy . . . For Today and for Tomorrow Technology for Life*

Paul Gipe, wind-works.org

*from N.F.S. Grundtvig



Renewable Tariffs-- New Policy Option for North America

www.wind-works.org

Manawatu Gorge, New Zealand

